OBITUARY NOTICES OF DECEASED FELLOWS.

Dr. Richard Bright was the third son of Mr. Richard Bright, an eminent merchant of Bristol, and commenced his education at a private school in the neighbourhood of that city. He subsequently was placed with the late Dr. Carpenter of Exeter. In the autumn of 1808, he matriculated at the University of Edinburgh, and attended the general lectures delivered at that celebrated school; but it was not until the following year that he entered upon the studies more immediately connected with the medical profession.

In the summer of 1810 he accepted an invitation to accompany Sir George Stuart Mackenzie and Mr. (now Sir Henry) Holland to Iceland; and the departments of Botany and Natural History in 'The Travels in Iceland,' subsequently published by Sir George Mackenzie, were written by Dr. Bright. On his return from Iceland he studied at Guy's Hospital for two years, and it was here that he acquired a taste for pathological investigations. He returned to Edinburgh in 1812, and graduated at that University in the following year. He intended likewise to take a degree at Cambridge, and entered as an undergraduate at Peterhouse; but he kept only two terms, finding the college requirements as to residence incompatible with his professional pursuits. He then became a pupil, as he was subsequently a colleague, of Dr. Bateman at the Carey-street Dispensary, and acquired a knowledge of cutaneous diseases under that distinguished disciple of Willan.

When the Continent was opened to travellers by the general peace of 1814, Dr. Bright visited Holland and Belgium, and spent some months at Berlin, where he attended the practice of Horn and of Hufeland, and made the acquaintance of Klaproth, Rudolphi, and Heim; during his residence at the Prussian capital, he acquired a thorough knowledge of the German language. From Berlin he went to Dresden for a short time, and arrived before the close of the year at Vienna, where he attended the practice of Hildebrand, Rust, and Beer, and became acquainted with Baron Jacquin, Prochaska, and the elder Frank. From Vienna he proceeded in the spring of 1815 to Hungary, and, on his way home, passed through Brussels about a fortnight after the battle of Waterloo, availing himself of the

occasion to witness the medical and surgical practice among the sick and wounded. His 'Travels in Hungary,' published in the year 1818, had reference to this period, and were deservedly popular. His account of the gipsies in that country was especially interesting; and his sketches, from which all the plates in that work are copied, showed his artistic skill to great advantage.

In December 1816 he was admitted a Licentiate of the College of Physicians, and was soon after elected Assistant Physician to the London Fever Hospital. In the zealous discharge of his duties there, he contracted fever during a severe epidemic, and narrowly escaped with his life. In the autumn of 1818 he again set out on a visit to the Continent, and soon after his return to England, in 1820, commenced practice as a physician in London. From this time he concentrated the whole of his public duties on Guy's Hospital, of which he became Assistant Physician, holding that appointment until 1824, when he succeeded to the office of Physician. His devotion to the duties of his profession, and to pathology in particular, throughout the period of his connexion with Guy's Hospital, was most remarkable. During many years he spent at least six hours a day in that great practical school, and his indefatigable industry and unrivalled talent for observation then laid the foundation for his well-known discoveries in renal disease.

After giving lectures on medical botany, Dr. Bright, in 1824, began to lecture on the theory and practice of medicine, and after some years associated Dr. Addison with him in that duty. He also, in conjunction with that gentleman, projected a work intended as a class-book and entitled 'Elements of the Practice of Medicine.' Only one volume was published, which appeared in 1839, and is understood to have been chiefly the composition of his coadjutor. Dr. Bright resigned the post of Physician at Guy's Hospital in the year 1843, and on his retirement was complimented by the Governors with the honorary title of Consulting Physician.

In 1832 he was elected a Fellow of the Royal College of Physicians, and in the following year delivered the Gulstonian Lectures, the subject being "The Functions of the Abdominal Viscera, with Observations on the Diagnostic Marks of the Diseases to which the Viscera are subject." In 1837 he delivered the Lumleian Lectures at the College, and he chose for his subject the disorders of

the brain. He subsequently presented the College with a descriptive account of the pathological collection of Dr. Matthew Baillie. He became a Fellow of the Royal Society in 1821 ; and at a subsequent period received the Monthyon Medal from the Institute of France.

Although Dr. Bright had occasionally suffered from illness for several years, the final and fatal attack—which was found to have depended on an extensive ossification of the aortic valves—was of short duration. He first became seriously ill on the 11th of December, 1858, and on the 15th, at midnight, breathed his last.

Dr. Bright's contributions to medical science are both numerous and important. His ' Reports of Medical Cases,' contained in two royal quarto volumes, published in 1827 and 1831, embrace investigations on diseases of the kidney, the lungs, and the brain and nervous system, and on the pathology of fever. The plates of this great work are all coloured ; they were executed under the author's immediate superintendence, and are exquisite samples of the peculiar art of representing faithfully and without exaggeration the morbid appearance of tissues and organs.

This celebrated work, rich as it is in the fruits of sagacious and untiring research, by no means comprehends the whole of Dr. Bright's published contributions to medical science. The volumes of the ' Medico-Chirurgical Transactions,' from the 14th to the 22nd inclusive (1828—1839), contain various papers from his pen ; and to the ' Guy's Hospital Reports,' from their commencement in 1836 up to 1843, the date of Dr. Bright's retirement from the Hospital, he contributed no less than sixteen important memoirs. In the eighth volume there is a paper " On Patients with Albuminous Urine," the joint production of Drs. Bright, Barlow, and Rees, in the preface to which (written by Dr. Bright) he thus calls attention to an important innovation in clinical study :—" The few following pages will be found to contain the record of the first attempt which, as far as I know, has yet been made in this country to turn the ample resources of an hospital to the investigation of a particular disease, by bringing the patients labouring under it into one ward properly arranged for observation."

Such were the numerous and varied contributions to general knowledge and to medical science made by Dr. Bright. No physician of the present day has, in our country, surpassed, perhaps

none has equalled him, in the extent of his original researches in pathology; and although his fame as a discoverer is founded chiefly on his researches into the pathology of renal disease in connexion with dropsy, his minute and unwearied investigation into the morbid anatomy of the kidney, and his detection of the albuminous state of the urine as pathognomonic of disease of that organ, yet a perusal of his writings abundantly convinces us that he brought the same sagacity and industry to bear upon many other problems in pathology and practical medicine. His labours in this country, as those of Andral and Louis in France, of Hufeland, the two Franks, and others in Germany, and Abercrombie in Edinburgh, contributed greatly to establish a more practical mode of investigation than had previously prevailed—a more direct attention to the connexion between the symptoms during life and the post-mortem appearances —a more constant and extensive application of animal chemistry and of the powers of the microscope to the elucidation of morbid conditions. Regardless of systems, a maxim laid down by him in early life, in the preface to his 'Travels in Hungary,' as applicable to the traveller, seems to have guided him throughout his distinguished career: "correct observation," says he, "and faithful statement are the cardinal virtues on which his character must depend."

William John Broderip, Esq., was the son of an eminent medical practitioner in the city of Bristol, where he was born on the 21st of November, 1789. Having received a sound training in classical knowledge at a provincial seminary, he proceeded in due time to Oxford, where he entered as a student at Oriel College. At Oxford he made the acquaintance of Dr. Buckland, who at that time (1809) was Fellow and Tutor of Corpus Christi College, but had as yet scarcely turned his mind to that study in which he afterwards became so distinguished. Young Broderip, on the other hand, carried with him to the University a considerable knowledge of Natural History, and especially of Conchology, with which he had from his earliest years been more or less familiar through means of a collection belonging to his father. Such as it was, the zoological acquirement of the student became of service to the future Professor, who in after-years of well-earned fame, was happy to acknowledge that he got his first practical lesson on fossil shells, and gathered

what became the nucleus of his own fossil cabinet, in a walk to Shotover Hill with his young friend Mr. Broderip.

After taking his degree of B.A., Mr. Broderip became a diligent student of the law at the Inner Temple. He was called to the Bar in 1817, and in 1822 was appointed a police magistrate, in which office he continued till 1856. In the latter period of his career he was elected "Bencher" and "Treasurer" of Gray's Inn, and to him was confided the especial charge of the library of that Society.

Amidst his arduous duties as a magistrate, Mr. Broderip found time to renew his zoological studies, and to begin the formation of a conchological cabinet, which soon grew into first-rate importance, and became an object of special interest to foreign naturalists visiting London, who seldom failed to profit by Mr. Broderip's readiness to open it freely to their inspection. This collection was purchased for the British Museum.

Mr. Broderip was elected Fellow of the Linnean Society in 1824, of the Geological Society in 1825, and of the Royal Society in 1828. He was a zealous cooperator in the formation of the Zoological Society, of which he was one of the original Fellows and Members of Council. He was Secretary of the Geological Society, conjointly with Sir R. Murchison, till the year 1830. His death took place on the 27th of February, 1859, from an attack of serous apoplexy.

These particulars of Mr. Broderip's personal history have been abridged from a brief memoir of him by one of his most distinguished friends*, who knew him well; and the following account of Mr. Broderip's scientific labours is borrowed entire from the same source.

"To the 'Transactions of the Geological Society' (2nd series, vol. v. p. 171), Mr. Broderip contributed a paper "On some Fossil Crustacea and Radiata found at Lyme Regis in Dorsetshire." His description of "The Jaw of a Fossil Mammiferous Animal found in the Stonesfield Slate" is published in the third volume of the 'Zoological Journal.' To the same periodical Mr. Broderip communicated "Observations upon the *Volvox globator*," "On the Manners of a live Toucan exhibited in this country," "On the Utility of preserving Facts relative to the Habits of Animals, with additions to two Memoirs in 'White's Natural History of Selborne,'" 'On the mode in which the Boa Constrictor takes its Prey," "On

* Prof. Owen in the Obituary Notices of the Linnean Society, 1859.

the Habits and Structure of *Paguri* and other Crustacea," a "Notice on the *Mus messorius*," together with several valuable conchological articles. The chief bulk of Mr. Broderip's original writings on Malacology was consigned to the 'Proceedings' and 'Transactions' of the Zoological Society. I may refer to the Indexes of those collections and publications, and to the 'Bibliographia Zoologiæ et Geologiæ,' published by the Ray Society, for the titles of these numerous and valuable memoirs.

"Few naturalists have more closely observed—none perhaps have more graphically and pleasingly described—the habits of animals. Mr. Broderip's 'Account of the Manners of a tame Beaver,' one of the pets that tenanted his chambers, published in the work entitled 'The Gardens and Menagerie of the Zoological Society' (vol. i. p. 167), affords a favourable example of his tact as an observer and power as a writer. Had circumstances permitted, he would have been a Field Naturalist second only to Gilbert White. When his friend Professor Owen became, through Royal favour, the tenant of one of the lodges in Richmond Park, Broderip would spend there much time in close observation of zoological phenomena afforded by the garden and the wooded vicinity of Sheen Gate. A note announcing the commencement of nidification in the adjacent rookery, or the arrival of a migratory song-bird, would immediately bring the retired Police Magistrate to Richmond Park. Many references to facts so observed are made in those delightful combinations of profound and quaint learning with direct and close observation of nature which were contributed by Broderip to the 'New Monthly Magazine' and to 'Frazer's Magazine,' and which he afterwards collected and reprinted in the volumes entitled 'Zoological Recreations' (8vo, 1847), and 'Leaves from the Note-book of a Naturalist' (8vo, 1851).

"Mr. Broderip was ever ready to aid a brother Naturalist. His collections, his rare zoological library, his pure classical taste and varied accomplishments, made the assistance he was able to give most valuable. We find it freely acknowledged in the early editions of Sir C. Lyell's 'Principles of Geology,' in the 'British Fishes' of Yarrell, in the 'Silurian System' of Murchison, and the 'Bridgewater Treatise' of Buckland. Broderip communicated a most valuable Table of the Situations and Depths at which recent Genera of

Marine and Estuary Shells have been observed,' to the Appendix of De la Beche's 'Researches in Theoretical Geology,' and, in conjunction with Captain King, 'Descriptions of the Cirripedia, Conchifera, and Mollusca collected during the Voyage of H.M.SS. Adventure and Beagle, 1826–30' (Zoological Journal).

"To the 'Quarterly Review' Mr. Broderip contributed articles on the Zoological Gardens, on the Vine, on the Cetacea and Whale-fisheries, on the Writings of Captain Basil Hall, on the Bridgewater Treatise of Dr. Buckland, &c. But the main bulk of this indefatigable student's zoological writings are contained in the 'Penny Cyclopædia,' viz. from Ast to the end, including the whole of the articles relating to 'Mammals,' 'Birds,' 'Reptiles,' 'Crustacea,' 'Mollusca,' 'Conchifera,' 'Cirrigrada,' 'Pulmograda,' &c., 'Buffon,' 'Brisson,' &c., and 'Zoology.'

"His last publication, 'On the Shark,' appeared in the March Number of 'Frazer's Magazine.' It was the 'first part' of an article on that subject, and bears all the marks of a mind in full intellectual vigour."

Isambard Kingdom Brunel was the only son of the late Sir Marc Isambard Brunel, whose mechanical genius and originality of conception he largely inherited. Young Brunel was born at Portsmouth in the year 1806, at the period when his father was engaged in the construction of the block-machinery for the Royal Dockyard. He received his general education chiefly at the Collège Henri Quatre at Caen, where at that time the mathematical masters were particularly celebrated; and to his acquirements in that science may be attributed the early successes he achieved, as well as the confidence in his own resources which he displayed throughout his professional career.

On his return to England, he was, for a time, practically engaged in mechanical engineering, at the Works of the late Mr. Bryan Donkin, and at the age of about twenty he joined his father in the construction of the Thames Tunnel, and there attained considerable experience in brickwork, the use of cements, and more especially in meeting and providing for the numerous casualties to which that work was exposed. The practical lessons there learned were invaluable to him, and to his personal gallantry and presence of mind,

on more than one occasion, when the river made irruptions into the tunnel, the salvation of the works was due.

One of his first great independent designs was that for the proposed suspension bridge across the river Avon, from Durdham Down, Clifton, to the Leigh Woods; and the acceptance of his proposal he owed to the fact that, upon the reference of the competing designs to two distinguished mathematicians, for the verification of the calculations, his alone was pronounced to be mathematically exact. Want of funds alone prevented, at that period, the execution of the design, which, however, there are now some hopes of seeing carried into effect by transplanting to that site the present Hungerford Suspension Bridge, which is itself the work of Mr. Brunel.

His introduction to Bristol led to his appointment as Engineer to the Docks of that city, which he materially improved. He had been previously engaged in the construction of the Old North Dock at Sunderland, and subsequently he designed the Bute Docks at Cardiff.

In 1833–34 he was appointed Engineer to the Great Western Railway; and whilst engaged on the surveys, he matured his views of the Broad Gauge, relative to which he sustained one of the hardest fought engineering contests on record. This work placed his reputation high among Engineers, and henceforth his mental and physical powers were taxed almost beyond those of any other member of the profession. His attention to all the details of even the smallest works was unremitting; and the Hanwell and Chippenham Viaducts, the Maidenhead, and other masonry bridges, the Box Tunnel, and the iron structures of the Chepstow and Tamar bridges on the extension of the Railway to the South and West, attest the boldness and originality of his conceptions, his taste in designing, and his skill in the use of various constructive materials.

The partial failure at the opening of the Great Western Railway appeared only to incite his inventive faculties, and to afford a field for the exhibition of his great powers. All the physical impediments were met and conquered; and his perseverance was ultimately crowned with success, in attaining a speed of travelling, combined with comfort and security, hitherto unrivalled.

In the attempted adaptation of the atmospheric system of propulsion to the South Devon Railway he was, however, signally unfortunate, in spite of all the ingenuity displayed; but this failure had the

effect of bringing into view a most pleasing feature of his character; for while he duly paid up all the calls upon the stake he had in the undertaking, he at the same time refused to accept the professional emolument to which he was entitled.

His services were in constant demand, in railway contests, before Committees of both Houses of Parliament; and he was employed to construct the Tuscan portion of the Sardinian railways, as well as to advise upon the Victorian lines in Australia, and the Eastern of Bengal.

Intimately, however, as the name of Isambard Brunel will ever be connected with the railway epoch in Great Britain, it is probably as the originator of the system of extension of the dimensions of steam-vessels that he will be best known to posterity.

The 'Great Western' steam-ship was his first innovation on the usual system. In constructing that vessel, which was much larger than any previously built, he had the able assistance of Mr. Paterson, of Bristol, as the shipwright, and of Mr. Joshua Field as the constructor of the engines; and in spite of adverse anticipations, even among practical men, the most triumphant success crowned his efforts, and demonstrated the correctness of his views.

His attention was at that time directed to the subject of propulsion by the screw, a subject on which Mr. F. P. Smith had been long and perseveringly labouring; and the experiments made by Mr. Brunel, in his voyages on board the 'Archimedes,' convinced him of the practicability of the adaptation of the system to large vessels. He then designed the 'Great Britain,' an iron ship of dimensions far exceeding those of any vessel of its period: that the first essays were not entirely successful must be attributed to the fact of the machinery not having been designed by those whose peculiar study it had been to produce engines of the class required for such vessels. The disaster in Dundrum Bay demonstrated the scientific design and the practical strength of the hull of the ship, and the successful voyages since made have proved the correctness of his original views. He was then appointed the consulting Engineer of the Australian Steam Navigation Company, whom he advised to construct vessels of five thousand tons burthen, to run the entire voyage to Australia without stopping. His counsels were, however, not followed.

The 'Great Eastern' was his crowning effort; and to the design and execution of this gigantic vessel, far surpassing in dimensions any ship hitherto constructed, he devoted all his energies. The labour was, however, too great for his physical powers, and he broke down under the wearying task; leaving to Mr. Scott Russell and Messrs. James Watt and Co., his cooperators in the construction of the hull and engines, the actual completion of the work he had so well and so perseveringly brought up to the day of starting on the trial trip.

The disasters attending the launch and the trial trip were perhaps inseparable from so novel an experiment, on so gigantic a scale, but the ultimate results may be looked forward to with confidence. Whatever they may be, the impulse given by Mr. Brunel to the construction of large-sized vessels is already felt both in our mercantile marine and in the Royal Navy.

This sketch of the professional labours of Mr. Brunel is of necessity brief and incomplete, nor can the details be given of the numerous scientific investigations in which he was engaged; but the devotion, during ten years of considerable portions of his time, to completing the experiments made by his father, to test the application of carbonic acid gas as a motive power in engines, must be mentioned. His special objects of study were mechanical problems connected with railway traction and steam navigation; and although he was not, perhaps, so sound, or so practical a mechanic as his friend, and, at the same time, constant opponent, Robert Stephenson, yet his intuitive skill and ready ingenuity enabled him to arrive at satisfactory solutions. The characteristic feature of his works was their size, and his besetting fault was a seeking for novelty, where the adoption of a well-known model would have sufficed. This defect has been unfairly magnified, wherever the pecuniary results of an undertaking have not reached the preconceived standard; and due allowance has not been made for the difficulties encountered in the prosecution of a new and bold enterprise. It might, perhaps, have been as well if a uniform gauge had been originally established for the United Kingdom,—and such may still be the ultimate result; but we must still admire the indomitable energy and consummate skill with which Mr. Brunel and his coadjutor, Mr. Saunders, pushed the broad gauge and its tributaries westward to Bristol, Gloucester,

and through Wales, to Milford Haven,—then south-west to Exeter and Plymouth, and onwards to the Land's End; and after invading the north-west manufacturing district of Birmingham, finally arriving at the shore of the Mersey opposite to Liverpool. This alone would have sufficed for the lifetime of many men; and in truth the stupendous labours undertaken by Brunel could scarcely be performed without overtaxing the mental and physical faculties, and eventually causing them to break down.

Mr. Brunel was fervently attached to scientific inquiry; he was a good mathematician, and possessed great readiness in the practical application of formulæ. He was elected at an unusually early age a Fellow of the Royal Society, and was an old Member of the Institution of Civil Engineers, of whose Council he was one of the Vice-Presidents; he belonged to most of the principal Scientific Societies of the Metropolis, and several Foreign Societies, and was a Knight of the Legion of Honour. A liberal patron as well as a discriminating judge of art, he was himself devoted to artistic pursuits, and his early drawings, as well as his professional sketches, attest his feeling for purity of design.

Of his private character, those only who were admitted to his intimacy could judge correctly. Brunel was not a demonstrative man, but there was a fund of kindness and goodness within, which only required to be aroused to stand forth in high relief. It has been well said of him by an old friend,—"In youth a more joyous, kind-hearted companion never existed. As a man, always overworked, he was ever ready by advice, and not unfrequently, to a large extent, by his purse, to aid either professional or private friends. His habitual caution and reserve made many think him cold and worldly, but by those only who saw merely his exterior could such an opinion be entertained. His carelessness of contemporary public opinion, and his self-reliance, founded on his known character and his actual works, were carried to a fault. He was never known to court applause. Bold and vigorous professionally, he was as modest and retiring in private life." He was cut off—in his fifty-fourth year—just when he had acquired that mature judgment which in such a profession as that of the Civil Engineer can be attained only by long experience, and when the greatest work of his life had reached the very eve of completion.

Edward Bury, Esq., was born at Salford, near Manchester, on the 22nd of October, 1794. He received his early education at a school in Chester. From early youth he exhibited, in various ways, a taste for machinery and construction, and eventually he became established as a manufacturer of engines and machinery at Liverpool. For some years following the opening of the Liverpool and Manchester, and the London and Birmingham Railways, Mr. Bury supplied numerous locomotive engines for those lines; and he appears to have been very successful in practically applying in the construction of these engines various improvements in steam-machinery which had been recently introduced or suggested. The details of his improvements are described in a paper "On the Locomotive Engine," which he contributed to the 'Transactions of the Institute of Civil Engineers.' He also acquired much consideration on the Continent on account of his steam-machinery, and especially for his improved engines employed in the navigation of the Rhone. For some years after the opening of the London and Birmingham Railway, Mr. Bury had the entire management of the locomotive department; and it deserves to be noticed, that, whilst his administrative services were duly recognized by the Directors, his tact, judgment, and conciliatory disposition gained for him, in a most unusual degree, the regard and confidence of those employed under him. Mr. Bury afterwards undertook a similar charge on the Great Northern Railway some time after it opened; and in the mean time he had been engaged in different important engineering works at home and abroad. He subsequently withdrew from active life, and died in his retirement, on the 25th of November, 1858. The date of his election into the Royal Society is February 1, 1844.

Henry Hallam, Esq., was born at Windsor (A.D. 1777). His father was Canon of Windsor and Dean of Bristol; the latter preferment he resigned during his lifetime. Mr. Hallam was educated at Eton, and to Eton he felt, and evinced throughout life, strong and grateful attachment. Both his sons were likewise educated there. Classical learning, then almost the exclusive study in that school, found a congenial mind in Mr. Hallam, and to the last he took great delight in its cultivation. Already at Eton he had become a sound and accurate scholar. Some of his verses, printed in the

'Musæ Etonenses,' are among the best in that collection, and show his command of pure and vigorous Latin, some fancy, and more thought than is usual in boyish compositions. From Eton he passed to Christ Church, Oxford. If his academic career was undistinguished, it was because in his time the University offered hardly any opportunities of distinction. But he remained a faithful member of the University. At the height of his fame he undertook the office of Examiner in Modern History; and Christ Church did herself credit by enrolling his name (he was already Doctor of Laws) among her honorary students created under the new academic system. Soon after he left the University, Mr. Hallam commenced the study of the Law. He entered himself as a member of the Inner Temple, became a Bencher, and took so much pleasure in the society of his legal friends, that, almost to the close of his life, he availed himself of the privileges and discharged the duties of that dignity. Some independent fortune, which was gradually increased, and an office under Government, in the Stamp Department,—an office which he held till the dissolution of the Board,—happily placed him above the necessity of striving for the emoluments of his profession, while those legal studies were an admirable preparation for his future career. Had he devoted himself to the practice of the Law, there can be no doubt that, although he may not have had the bold and ready eloquence, the pliancy, quickness, and versatility of a consummate advocate, yet his profound, accurate, and comprehensive learning, his indefatigable industry, his sagacity in penetrating to the depths of an abstruse subject, his grave, calm wisdom, which had so much of the true judicial character, might have led him to the highest honours and rank in the Law. It is well, however, for his country, for the cause of letters, and indeed of Constitutional Law itself, that he left the dignity of the Bench or of the Woolsack to his eminent contemporaries, and became—what no other man of his day could have become—the Historian of Constitutional Government and Law. In that character, and in that of a man of letters, he has acquired fame and influence as extensive as the world-wide English language, and indeed throughout the whole of Europe, where his works are generally known by translations. Mr. Hallam became, by deliberate choice and predilection, a man of letters in the highest and noblest sense. His dignified mind, and we may add, his indepen-

dent circumstances, as they had placed him above following the Law, so also raised him above following literature as a profession. He was in the enviable position that, while he sought and obtained the fame, he could disdain the drudgery of authorship; and there was no fear that such a mind would degenerate into indolence, or indulge in the serene voluptuousness of literary leisure. He was a man of books, but not of books only; he took great delight in society, in which he mingled freely; and his own house was open not only to many attached friends, and to his legal contemporaries, but to statesmen, men of letters, of art, and of science, and to cultivated foreigners, whom he received with easy hospitality. There were few distinguished men in England, or even in Europe, who were not proud of his acquaintance; with many he lived on terms of the most intimate friendship.

Mr. Hallam became early a Member of the Royal Society. Though not strictly to be called a man of science, yet his active and comprehensive mind was sufficiently grounded in the principles of most of the exact sciences, especially of mathematics, to follow out their progress with intelligent judgment, and to watch their rapid advance with the utmost interest. In the proceedings of this, and of other kindred societies, particularly the Antiquarian, as well as in the administration of the British Museum, of which he was an elected Trustee, he took part; and always, from his remarkable range of knowledge and sound practical habits, with great advantage.

But though Mr. Hallam had thus early taken up his position as a man of letters, he did not come forward as an author till of mature age, and then, with a publication which had demanded years of industrious research and of multifarious inquiry. It was the grave and deliberate work of a man conscious of great powers, one also (which is more rare) fully conscious of the responsibility attached to such powers, and who well knew that the best faculties and attainments may be wasted, as to permanent usefulness and enduring fame, by that hasty ambition which grasps too eagerly after popular applause, and wearies the public mind by incessant demands on its attention. Till this time Mr. Hallam was only known by his general reputation as a well-read and accomplished scholar, and by some articles in the 'Edinburgh Review.' The conductor of that journal, then at its height of power and fame (as appears from recent publi-

cations), fully appreciated the value of his aid, the extent and the variety of his attainments; one of his articles on Scott's 'Dryden' was remarkable as blending the courtesy due to a man like Walter Scott with free and independent judgment of his opinions, and at the same time as giving a just but discriminate criticism on the most unequal of our great poets.

It was not till past his fortieth year (A.D. 1818) that Mr. Hallam announced himself to the world as an author; but his 'View of Europe during the Middle Ages' placed him at once in the highest rank of historic writers. Of the great qualifications of a historian, except that of flowing, rapid, living narrative (precluded by the form of his work, which unavoidably took that of historical disquisition), none appeared to be wanting. There was profound research into original sources of knowledge, where they existed; the judicious choice of secondary authorities, which always met with generous and grateful appreciation; sagacity in tracing the course of events and the motives of men; thorough independence of judgment, which cared not what idols it threw down in the pursuit of truth; singular firmness with unaffected candour; above all, an honesty of purpose, which almost resembled a passion (the only passion which he betrayed); a style manly, clear, vigorous,—if inartificial, sometimes unharmonious, yet sound idiomatic English,—an apt vehicle for the English good sense which was the characteristic of the whole. There was no brilliant paradox, no ingenious theory to which all the facts must be warped: all was sober, solid, veracious. The 'View' was received not only with respect, and with the acclamation of all qualified to judge of such a work, but even with popularity, considering its subject and extent, surprising. It was emphatically described by a high authority of the day as a book which every scholar should read, and every statesman study. Like all great works of the kind, it created and supplied a want in the public mind. The History of the Middle Ages up to this time was a wilderness, which few were disposed or able to penetrate. There had been much laborious investigation, much ingenious speculation on parts of the subject; but it was a labyrinth which wanted a clue,—darkness which repelled, confusion which bewildered. The 'View' was as remarkable for its completeness and comprehensiveness as for its depth and accuracy. Though the subjects on which Mr. Hallam dwelt at greatest extent,

and it seemed with greatest predilection (as, indeed, of the most importance), were the rise, growth, and development of the governments, laws, civil, political and religious institutions of the European family of nations, yet the book likewise entered with great though proportionate fulness on the progress of customs, inventions, language, letters, poetry, arts and sciences. It was enlivened by many passages of fine criticism; the note on Dante, for instance, may be read with high interest, after all that has been subsequently written on the great Italian poet. Since the publication of Mr. Hallam's work, awakened curiosity, the study of the philosophy of history, chiefly by Continental writers, and, above all, religious zeal, have investigated almost every point relating to the Middle Ages with emulous ardour and industry; yet Mr. Hallam's work has stood the test, and still maintains its ground. Mr. Hallam himself, with the modesty inseparable from true wisdom, and only anxious for the promulgation of sound truth, instead of narrow jealousy of trespassers upon his province, watched with careful interest every advance in knowledge on those subjects which he had treated almost without a guide. In a supplemental volume, afterwards incorporated with the original work, he collected from every quarter of Europe whatever in his judgment might throw a broader and clearer light on these dark places of mediæval history.

Nearly ten years elapsed before the publication of Mr. Hallam's second great work, 'The Constitutional History of England,' in July 1827. This was in some respects a continuation of part of the former book, which, among the other polities of Europe, had traced the growth and expansion of the British Constitution during the Middle Ages. It may be almost enough to say of this work, that by common consent it has become the standard authority on its all-important subject. It is constantly appealed to in the Houses of Parliament; it is the text-book in the Universities as well as in the higher schools; and this, from a general infelt acknowledgment of its truthfulness, which overawes and convinces against their will those to whom its doctrines may at first sight seem unacceptable. Nor was this from a cold, stately assumption of superiority to the great questions which have divided Englishmen in all ages. Throughout the work, in which every event which has stirred the passions of men, every character illustrious for good or for evil in our annals, passes in review, and is summoned to judgment,

though Mr. Hallam holds avowedly and without disguise his own strong opinions, those of a calm, conscientious Whig of the old school, still there is an enforced impression that nothing could tempt him to be an unfair partisan ; that he seeks, and only seeks—and seeks without fear, without compromise, without awe of great names, without respect for popular idolatry—right and truth, justice and humanity, sound law, tolerant religion. If there has grown up a more general accordance of sentiment and opinion on English Constitutional History; if extreme differences have died away, and, so far as past times are concerned, the old party watchwords have nearly sunk into oblivion; if there has been greater general sympathy for the wise and good, more unanimous reprobation of the base and bad, this may in some degree be attributed to the influence of 'The Constitutional History of England.'

After another interval of nearly the same length (in Sept. 1838 and July 1839) appeared the 'Introduction to the Literature of the 15th, 16th, and 17th Centuries.' This view of the intellectual development of the world during the most active and prolific period in the history of the human mind, if with Mr. Hallam a work of labour (to most others it had been a work of intense labour), was yet a work of love. It was the overflow of a mind full to abundance of the best reading on almost all subjects, a disburthening, as it were, and a relief from the stores of knowledge accumulated during a long life. If it be hardly possible for a single mind to achieve a history of literature during three centuries (the work bore the modest title of 'Introduction to the Literature of Europe'), yet much is gained by the unity of the work, by the proportion, harmony and order in the distribution of its parts ; and if one mind was capable of passing a fair judgment on such different productions of human thought and imagination, it was that of Mr. Hallam. How well he had read the best authors may be tested by his criticisms on Shakspeare, on Ariosto, on Cervantes, and on some of our older poets ; his power of grappling with more profound and abstruse subjects, by his estimate of Locke ; while writers of a more dry and uninviting class, scholars, even grammarians, pass before us, if with less minute investigation, with much more than a dull and barren recension of their names.

Only one other work, a small one, bears the name of Mr. Hallam; and that, though printed for private distribution, having been liberally

communicated to his numerous friends, may justify at least a passing allusion. It records a melancholy chapter in an otherwise uneventful life to which men of letters might have looked with respectful envy. It pleased Divine Providence to try this wise and blameless man with almost unexampled domestic affliction. He married an excellent lady, the daughter of Sir Abraham Elton. Of many children, four only, two sons and two daughters, grew up to mature age. The eldest son was one whom such a father (for Mr. Hallam, with not much outward show, was a man of the deepest and most tender affections) could look upon with pride, with love, and with hope allotted to few distinguished men. What was the promise of Arthur Hallam may be known from the volume of his 'Remains,' printed by his father; what he was in disposition as well as in mind, from the exquisite 'In Memoriam' of Mr. Tennyson. The blow which bereft Mr. Hallam of this son was frightfully sudden. His eldest daughter and his wife followed the first-born to the grave. One son remained; he too, if of less originally speculative and poetic temperament than the elder, with great acquirements and endowments, was gifted also with a gentleness and tenderness of disposition, singularly fitted to be the consolation, the surviving hope of such a father. He too was carried off with almost equal suddenness. One daughter remains, married to Colonel Farnaby Cator, and has children. Bowed but not broken by these sorrows, Mr. Hallam preserved his vigorous faculties to the last, and closed his long and honoured life in calm Christian peace.

Arthur Henfrey was born at Aberdeen, of English parents, on the 1st of November, 1819. He studied medicine at St. Bartholomew's Hospital, and in 1843 became a Member of the College of Surgeons, but delicate health prevented him from engaging in the practice of his profession. Accordingly, having a taste for botany, and having already attained to great proficiency in that science, he thenceforth devoted himself exclusively to its pursuit, and soon acquired a distinguished position among English Botanists. In 1847 he was appointed Lecturer on Botany at St. George's Hospital, and in 1854 succeeded the late Professor Edward Forbes in the Botanical Chair at King's College; he was also Examiner in Natural History to the Royal Military Academy and the Society of Arts.

Notwithstanding his feeble bodily constitution, Professor Henfrey's labours were incessant. Whilst constantly engaged in original investigations, the results of which he made known in various papers which appeared in the 'Transactions' of the Royal and Linnean Societies, the 'Annals and Magazine of Natural History,' and the 'Journal of the Agricultural Society,' his untiring industry also enabled him to furnish numerous translations and abstracts of foreign memoirs to the Natural History Journals, and to give reviews and critical notices of botanical works in these periodicals, as well as in the 'Quarterly Review.' Moreover, he translated several independent works from the French and German languages, and composed some valuable elementary treatises on botanical subjects, of which his 'Elementary Course of Botany,' published in 1857, is the last and most important. For three years also he conducted the 'Journal of the Photographic Society,' and since 1858 was one of the most active editors of the new series of the 'Annals of Natural History.'

Professor Henfrey was a man of an amiable and gentle nature, which neither the pressure of daily toil nor the trying interruption of ill-health could ever ruffle: his death, on the 7th of September, 1859, at the early age of thirty-nine, hastened as it probably was by his unremitting exertions, has been deeply lamented by all who knew him.

Thomas Horsfield, M.D., was born at Bethlehem, in Pennsylvania, on the 12th of May, 1773, of parents who were Moravians, in which Christian communion he lived and died. He was educated for the medical profession in the University of Pennsylvania, where he took the degree of Doctor of Medicine in 1798. Early in life he went to Java, where he passed sixteen years, actively engaged in the pursuit of Natural History, to which he had devoted himself. During his residence in Java, he thoroughly explored every part of the island, in quest of its natural productions. From Java he visited Banca, and gave the fullest and best account which exists of that island. After the restoration of Java to the Dutch in 1816, Dr. Horsfield made a long sojourn in Sumatra, and there continued his favourite studies; but having made the friendship of Sir Stamford Raffles, who is said to have imbibed from Horsfield his well-known

love of Natural History, he followed that eminent person to England in 1818, and soon after was made Keeper of the Museum of the East India Company, which charge he held till his death, which took place on the 24th of July, 1859, in the 87th year of his age.

Whilst in the East, Dr. Horsfield diligently collected the plants of Java and the adjacent islands; and the folio volume afterwards published in this country, under the title of 'Plantæ Javanicæ Rariores,' contains figures of selected species from his collections, with descriptions furnished by his friends Mr. J. J. Bennett and the late Mr. Robert Brown. During his stay in Java also, he contributed various papers on the Geology and Natural History of the Eastern Islands to the 'Transactions of the Batavian Society,' of which he was a member. The same collection also contains a very interesting experimental inquiry, by Dr. Horsfield, on the physiological action of the Upas Antiar poison, the juice of a tree which was afterwards figured and described in the 'Plantæ Javanicæ.' His writings on Zoology are, chiefly, his 'Zoological Researches in Java,' 4to, 1821; the valuable Catalogues of the several zoological departments of the East India Company's Museum, and numerous papers on zoological subjects contributed to the 'Linnean Transactions,' the 'Zoological Journal,' and the 'Proceedings of the Zoological Society.' His latest publication is the 'Catalogue of the Lepidopterous Insects in the East India Museum,' of which only the first volume has appeared; it was compiled by Mr. Moore, his assistant, from Dr. Horsfield's materials and manuscripts, and under his direction. Dr. Horsfield had some years before commenced a Catalogue of these insects, of which only two parts were published (1828–29); and this publication, though incomplete, deserves notice, as containing an elaborate Introduction, with a general arrangement of the Lepidoptera founded on their metamorphoses. The importance of the transformations of insects in reference to their classification had indeed become early impressed on Dr. Horsfield's mind, and he accordingly spent three seasons during his stay in Java in collecting the larvæ of numerous species of Lepidoptera, watching their development, and making careful descriptions and drawings of their successive changes up to the perfect state.

Dr. Horsfield was a member of various learned societies at home and abroad. He was elected a Fellow of the Linnean Society in

1820, and of the Royal Society in 1828. He was a man of retired habits, but of amiable character and unblemished integrity.

Manuel John Johnson, the late Radcliffe Observer, expired suddenly on the 28th of February, 1859, in the fifty-fourth year of his age. Cut off as he was in the midst of his invaluable labours and in the full vigour of his high intellectual powers, his death has caused a severe loss to science, which, however deeply deplored by the numerous friends who enjoyed the privilege of his intimate acquaintance, will only be appreciated in its full extent when the great and important works which he designed, and so nearly executed, shall have been duly completed.

After passing through the usual course of studies at Addiscombe College, Mr. Johnson commenced his public career in 1821 as an officer in the St. Helena Artillery, and while acting as aide-de-camp to General Walker, then in command of the island, was appointed to the control of a small but efficient observatory, founded by the Honourable East India Company. The establishment came into active service in 1829, and in the short space of three years and a half, a valuable catalogue of 606 stars had been observed by the young astronomer and a single assistant. This catalogue was afterwards published, at the expense of the Court of Directors, in the 'Memoirs of the Royal Astronomical Society,' and obtained for its author the award of the gold medal of that body in the year 1835.

On the termination of this important work, Lieut. Johnson returned to England, and entered the University of Oxford as an undergraduate. On the death of Professor Rigaud, in 1839, he was appointed Radcliffe Observer, and speedily rendered the Observatory one of the most active scientific institutions in the world.

One of his first acts was to obtain permission of the Radcliffe Trustees to publish an annual volume of Observations—thus scorning the life of comparative ease he might have chosen, and giving the world an effectual guarantee for the performance of those self-imposed duties to which he so willingly and faithfully devoted the remainder of his life. He accordingly immediately began the re-observation of 'Groombridge's Circumpolar Catalogue,' adding thereto all conspicuous adjacent stars, and many others of especial interest. To this important work the resources of the Observatory were devoted for

more than fourteen years: volume after volume has been issued with a regularity hitherto unsurpassed; while the high character for accuracy of the star-places in each annual catalogue has been fixed by the unanimous approval of the most eminent European authorities. To render this great work complete, however, required the reduction of every individual observation to a fixed epoch, and the incorporation of the whole into one general catalogue. Much yet remained to be done, though the work was fast progressing; and had its lamented author been spared another year or two, he would have presented to astronomers a monument of industry and devotion to duty unsurpassed in the annals of British science. The point now most to be desired, previous to the publication of the final catalogue, is, a rigorous investigation of the errors of division of the Meridian Circle, which has not yet been attempted, owing to the too numerous and pressing pursuits of the unwearied and enterprising Director.

In 1854 a new project was commenced,—'A Catalogue of Remarkable Objects,' comprising all stars of suspected large proper motion, the binary systems, variable and coloured stars, all bright stars down to the third magnitude, and indeed whatever of interest was observable with a four-inch object-glass. In the discussion of proper motion Mr. Johnson's plan of procedure was that adopted by Mädler, viz., instead of deducing the change of place from *two* most widely distant authorities alone, to employ *all* published positions, and thus to deduce the best possible final value; leaving no broken link, no contradictory observation uncorrected, or at least unnoticed, to raise future discussion as to the value derived. Such a method is of course the most laborious, but nothing less can be regarded as definitive, and, to secure the best results, neither time nor trouble was spared.

The most eventful epoch in the history of the Radcliffe Observatory and of its late Director remains to be noticed, viz. the establishment of the fine heliometer—a treasure unique in its improvements, unrivalled in its marvellous powers, but almost the labour of a life to develope and turn to the best account. It was erected by its makers, Messrs. Repsold of Hamburg, in October 1849, and was forthwith employed in incessant and toilsome research by its skilful manipulator. The Radcliffe Trustees, with their usual liberality, not only provided and equipped this very costly instrument, but, in order

to enable Mr. Johnson to devote himself almost exclusively to its use without interrupting the pursuits of which we have already spoken, granted him an additional assistant. After a careful study of the peculiarities of the instrument, in the course of which his acquaintance with German enabled him to derive most important aid from the learned disquisitions of Bessel, Hansen, Wichman, and other astronomers, an elaborate description of it appeared in the preface to vol. xi. of the Radcliffe Observations. The detection and treatment of certain corrections peculiar to the Oxford heliometer afforded a fine example of Mr. Johnson's suggestive genius. Before commencing the more difficult investigations of stellar parallaxes, he passed, step by step, through a patient and judicious course of training, by the measurement of some well-known double stars, of the diameters of the planets, and of the brighter stars in the Pleiades. In 1851 the heliometer was employed in a novel and purely original manner to determine the light-ratios used by different astronomers in their estimations of the magnitudes of the fixed stars. In the two following years his most successful achievements with this instrument were accomplished, viz. the determinations of the parallaxes of the stars 61 Cygni and 1830 Groombridge. His near agreement with the values obtained by Bessel for the former, and by Professor Peters and Otto Struve for the latter object, was most satisfactory, and gave ample evidence of his complete success in these intricate investigations. In 1854 and 1855 the parallaxes of Castor, Arcturus, α Lyræ, and one of the comparison stars previously used in the case of 1830 Groombridge, became the objects of researches the details of which are given in vol. xvi. of the Radcliffe Observations.

The same spirit of enterprise and progress which Mr. Johnson evinced in the purely astronomical part of his duties was manifested in a yet more marked degree in his management of the meteorological department. From a single page of ordinary records of the barometer and thermometer, the subject rapidly expanded, under his treatment, to an extent hitherto unprecedented. The introduction of photography as a means of barometric registration by Mr. Ronalds, and its ingenious extension to the wet- and dry-bulb thermometers by Mr. Crookes, as also, at a later period, to the records of the direction and strength of the wind and the depth and time of fall of rain,

added such an amount of anxious labour to the already overwhelming requirements of his office, as for the last three years completely precluded him from making further researches with the heliometer. This is the more to be deplored, as there is reason to fear that the monotonous, though cheerfully endured, fatigue inevitable in reducing so novel and accumulative a process to a regular system, accelerated the sad event which it has been our mournful task to record.

An earnest labourer himself, Mr. Johnson was ever ready to further the scientific labours of those whom he had it in his power to assist; and it was in this spirit that he sanctioned and encouraged his assistant, Mr. Pogson, in making independent researches with the Radcliffe Equatorial, after the hour of closure of the official work of the Observatory, whereby that gentleman was enabled to discover four planets and ten new variable stars.

The remembrance of his high social qualities, his refined taste, and extensive fund of ready information in literature and the fine arts as well as in science, his frank and agreeable demeanour, his thorough integrity of purpose, and his unostentatious benevolence, will be long cherished by a wide circle of friends, especially in the University, where he was so bright an ornament and so general a favourite.

He was President of the Royal Astronomical Society in the years 1857 and 1858, and was elected a Fellow of the Royal Society in 1856.

Lieutenant-Colonel Charles Hamilton Smith was born in Austrian Flanders, on the 26th of December, 1776, of a Protestant family holding a good position in the province, and partly of British descent. He was bred to the military profession, and began his career as a volunteer in the British army in the Netherlands, but soon obtained a commission, and in 1797 was transferred to a regiment in the West Indies. After serving for twelve years in that part of the world, he returned to Europe, and joined the Walcheren expedition as Deputy Quartermaster-General. In 1813 he was again employed in the Low Countries; and on this occasion he succeeded, with a handful of men, in capturing the fortress of Tholen, whereby a new and better basis of operations was opened up to the British forces in Brabant. After being engaged, in 1816, on a mission to the

United States and Canada, in connexion with the Foreign Office, he, in 1820, retired from active public duty.

In the course of his active military life, Colonel Smith found time for varied study. History, Archæology, and Zoology were his favourite subjects, and these he continued to cultivate in his retirement. The matured results of his labours he gave to the world in various well-known works, of which he was sole or part author. For many of these he had early begun to accumulate materials, especially pictorial representations of the objects described; and for this employment his taste and skill as a draughtsman gave him both inducement and facility.

Whilst on the staff of the Horse Guards, he wrote the military part of Archdeacon Coxe's 'Life of Marlborough,' which is said to have excited the interest of Napoleon at St. Helena as to its authorship, inasmuch as it showed a practical acquaintance with military affairs scarcely to be expected of a churchman. He is also the author of the article "War" in the 'Supplement to the Encyclopædia Britannica,' and of the introductory paper on the "Science of War" in the 'Aide Mémoire' of the Royal Engineers.

The first publication in which the powers of Colonel Smith's pencil were called into requisition was the 'Costume of the original Inhabitants of the British Islands,' undertaken in connexion with the late Sir Samuel Meyrick. A still greater work, which was in reality hardly less indebted to Colonel Smith, although his name does not appear in the title, is Sir S. Meyrick's 'Critical Inquiry into the History of Ancient Armour.' We are informed that most of the illustrations (blazoned in gold and colours) of that celebrated work were copied, with his full concurrence, from Colonel Smith's drawings.

Well, however, as Colonel Smith was known as a historical antiquary of no common order, his reputation as a writer on Natural History was perhaps higher. The article "Ruminantia" in Griffith's edition of Cuvier's 'Règne Animal' (1835) was written by him; and many of the engravings in that edition were from his drawings. At a later period he supplied the volumes on 'Dogs,' 'Horses,' and 'Introduction to Mammalia,' to Sir William Jardine's 'Naturalist's Library'; and in connexion with the same series, he published in 1848 his 'Natural History of the Human Species.' He was also the author of the elaborate articles on Natural History, and

Warfare, in the 'Cyclopædia of Scriptural Knowledge,' edited by Dr. Kitto.

The extraordinary amount of materials collected by Colonel Smith is not, however, to be estimated only by his published works. He has left more than twenty volumes of manuscript notes on the most varied subjects. In many instances these notes illustrate his remarkable collection of drawings, amounting in number to many thousands. The whole of these valuable collections, as well as his personal assistance, were throughout his life placed freely at the disposal of all to whom they could be of service; and it was at all times sufficient for the Colonel to be assured that by his advice and assistance he could further the objects of the literary inquirer or the artist to ensure his active cooperation.

Colonel Smith became a Fellow of the Royal Society in 1824, and of the Linnean in 1826. On the formation of the Devon and Cornwall Natural History Society, he was elected President. On his retirement from active military service he fixed his residence at Plymouth, where he died on the 21st of September, 1859.

Sir GEORGE THOMAS STAUNTON, Bart., D.C.L., was the only child of the late Sir George Leonard Staunton, who is well known to the public as having accompanied Lord Macartney as Secretary of the first Embassy to China, in the year 1792, and as the author of the account of the Embassy which was afterwards published. He is not less known to those who are acquainted with the history of British India, as having, when Lord Macartney was Governor of Madras, concluded the peace with Tippoo Sultan in the year 1784.

Sir George Thomas Staunton was born in May 1781, and died, after a succession of paralytic seizures, in the summer of 1859. He succeeded his father in the baronetcy in the year 1801. After his father's death he was the last male representative of a very ancient English family, the branch of it from which he was descended having been established as landed proprietors in the county of Galway in Ireland since the middle of the 17th century.

Sir George Leonard Staunton had some peculiar notions as to education, which he endeavoured to carry out in the training of his son. The son was brought up entirely at home, under his father's eye; and, except on a few very rare occasions, never associated with

boys of his own age, but lived entirely in the society of older persons. A tutor living in the house instructed him in the Greek and Latin languages. He had masters to teach him Mathematics, Botany, and other sciences, and he attended lectures on the various departments of Natural Philosophy. Partly, perhaps, from his not being occupied with the pursuits of other boys, but principally from his being naturally endowed with great powers of application and much readiness of apprehension, he made a remarkable progress in all these branches of knowledge; so that when he was not more than fifteen or sixteen years of age he was as much advanced as many even diligent students when they are eight or ten years older.

In the year 1792 he accompanied his father to China, under the nominal designation of Page to the Ambassador. For some time before the embassy embarked, and during the voyage to China, he had the opportunity of studying the Chinese language under two native Chinese missionaries from the Propaganda College at Naples; and he soon made such proficiency as to be able to speak it with tolerable fluency, and to copy papers written in the Chinese character. In this manner he became very useful to the embassy. When the embassy was presented at the Chinese Court, the Emperor inquired for the little boy who could speak Chinese, conversed with him for some time, and good-naturedly presented him with an embroidered yellow silk purse for holding areka-nuts, from his own girdle.

On leaving China, Sir George L. Staunton engaged a Chinese servant to accompany him to England, in order that his son, by constantly communicating with him in Chinese, might keep up and extend his knowledge of the language.

In the year 1799, having received the appointment of Writer in the factory of the East India Company at Canton, young Staunton proceeded a second time to China. He remained at Canton, with some occasional visits to Europe, until the year 1817, having for some time before his final return to England filled the office of Chief of the factory. His residence in China afforded him the opportunity of still further advancing himself in a knowledge of the Chinese language by means of native teachers. He was the first among the members of the factory who had ever studied the language of the country in which their duties required them to reside;

and thus he became very useful by superseding the necessity of employing native interpreters, in whom (principally from the fear which they had of the local authorities) much confidence could not be placed. While residing in China, he made several translations from the Chinese; the principal, and that a work of great importance, being the 'Ta Tsingleu-lee,' or Chinese penal code. This last was published in the year 1810. Other translations of much interest, though of inferior importance to this, have been published since.

In the year 1816 a second embassy was sent to China, the late Lord Amherst, Sir Henry Ellis, and Sir George Staunton being appointed joint Commissioners of Embassy. An account of the proceedings of this Embassy has been published by Sir Henry Ellis. Sir George Staunton, however, printed his private journal, and distributed copies of it among his friends.

After his return to England, Sir George Staunton purchased a house and landed property in Hampshire, where he afterwards resided during a part of every year. For some time he had the honour of representing South Hants in Parliament. He afterwards represented Portsmouth, and continued to do so until he resigned the charge a very few years before he died.

After his being finally re-established in England, he occupied himself but little with the pursuits of his early life; though it may have been partly his knowledge of botany that led him to lay out an extensive garden, with numerous hothouses and conservatories, full of the rarest trees and plants.

Although his life was prolonged until he had entered on his 79th year, he was always of a delicate frame, and not capable of great physical exertion. Others observed in him a certain shyness and awkwardness of manner, of which his peculiar education affords an adequate explanation. But with this he on various occasions displayed great moral courage and determination. Many instances of this might be quoted, but one will be sufficient. On the occasion of the second embassy, the Chinese Court refused to receive it unless the ambassadors performed the ceremony of the *Kotou* before the Emperor. Lord Amherst and Sir H. Ellis wished that they should do so, but Sir George was so satisfied that it would be regarded by the Chinese as an act of humiliation, and something like the homage paid to a feudal lord, that he positively refused his consent. The

Chinese were aware of this, and threatened to dismiss the rest of the embassy, but to detain him as a prisoner. But he declared that this made no alteration in his view of the subject; that, being convinced that he was right, he was quite ready to take his chance of whatever might befall him, rather than swerve from what he regarded as the strict line of his duty.

Mr. Robert Stephenson, M.P., the only son of the late Mr. George Stephenson, was born on the 16th of October, 1803, at Willington Quay, near Newcastle-upon-Tyne, where his father had charge of the colliery engine. The rudiments of his education were received at the village school at Long Benton, whence he was transferred, at the age of ten years, to the academy of Mr. John Bruce, at Newcastle, which he left at the age of sixteen. He then received some instruction in mathematics from Mr. Riddell, now the Master of the Naval School at Greenwich, and was apprenticed as a coalviewer to Mr. Nicholas Wood, with whom he stayed about three years. Mr. George Stephenson having by that time raised himself to the position of a consulting mechanical engineer, and appreciating the advantages of that education which it had not been his own good fortune to receive, determined to send his son to the University of Edinburgh, where Robert Stephenson was entered in 1821. During one session, which was all that could be afforded for him, he followed so indefatigably the lectures of the celebrated Professors Leslie, Hope, and Jameson, that he carried off most of the prizes of the year; and feeling the value of the opportunity, he laboured most assiduously, not only to learn everything that was placed before him, but more especially to lay the foundation for future self-instruction.

In 1822 he quitted the university to become the apprentice of his father, at the works then first established at Newcastle-on-Tyne for the manufacture of machinery, and whence proceeded the locomotive engines which were destined to produce such a revolution in the internal communication of all countries.

His health having suffered from unremitting study and close application to his duties at the factory, he accepted in 1824 an appointment to investigate and to report upon some silver mines in South America. This occupied him for nearly four years; and upon his report the Columbian Mining Association was formed. Before his

departure for America he had assisted his father in the survey of the line of the Stockton and Darlington Railway, which was opened for traffic on the 27th of September, 1825. During the progress of the works, public attention was so much attracted to the subject, that the project was resuscitated for a railway between Liverpool and Manchester, intended chiefly for the conveyance of cotton from the port to the place of manufacture. Mr. George Stephenson was appointed to survey the line contemplated for the undertaking; and being afterwards appointed engineer for the construction of the work, in the year 1826, and feeling the need of his son's assistance, he summoned him to England. Robert Stephenson, on his return home by way of the United States of America and through Canada, fell in with Trevithick, who was also coming home from South America. That steam locomotion should form a constant topic of conversation between two such men was only natural; and Robert Stephenson, who was already acquainted with and had assisted in carrying out the improvements of his father in the Killingworth and other locomotive engines, was well inclined to listen to what were then considered the "visionary schemes" of Trevithick, whose utmost ideas of attainable speed were, however, so soon to be far exceeded.

Whilst engaged, after his arrival in England, in assisting his father in the construction of the Liverpool and Manchester Railway, Robert Stephenson at the same time directed his attention to the systems of railway traction, and was successful in the competition for the prize offered by the Directors of the railway for the best locomotive engine. The result of his experiments, added to the joint Essay by himself and Mr. Joseph Locke, in reply to the Report of Messrs. Walker and Rastrick, which recommended fixed engines and rope traction, led to the settled adoption of the locomotive engine, and contributed materially to decide the question of the general introduction of railways in this country. Soon after this he constructed the 'Planet' engine, at the Newcastle factory, which became the type of all the very successful engines that have been since employed. About the same period the United States Government sent three officers of the corps of Topographical Engineers to examine into and report upon steam locomotion on railways as practised in this country. For these gentlemen Robert Stephenson designed and constructed two locomotive engines, embodying a special contrivance adapting them to traverse

the sharp curves of the American railways; and in the majority of the American engines that mode of construction has since been followed. Thus it is to Robert Stephenson that are due the types of the locomotive engines used in both hemispheres.

The successful result of the Liverpool and Manchester Railway led to the project of a line between London and Birmingham. The survey for this line had been entrusted to Robert Stephenson, who removed to London for the purpose of devoting himself to the execution of the works, which had also been committed to him. They were very heavy, and demanded the exercise of the greatest skill and constant personal attention, especially in such works as the Kilsby Tunnel, where the quantity of water met with threatened to stop the proceedings. The railway, which was commenced in 1834, was completed in 1838; and such was the reputation acquired by the engineer, that his advice and assistance were henceforth sought in all the important undertakings of the period, either for the construction of the works or in prosecution of the bills before Parliament. Foreign governments also sought his assistance; and for the attention devoted to the scheme for the Belgian railways, both George and Robert Stephenson received from the King of the Belgians, in 1844, the decoration of the Order of Leopold. Robert Stephenson received also, in 1848, the Grand Cross of St. Olaf of Norway for similar services. He was thus consulted on the construction of railways in Belgium, Switzerland, Germany, Norway, Denmark, Tuscany, Canada, Egypt, the East Indies, and other countries. During the progress of these large systems of lines, he was called upon to design and to execute many very important and some very novel works, of which we can here only mention the Kilsby and numerous other tunnels, large viaducts, such as the High Level Bridge at Newcastle-on-Tyne, the Victoria Bridge at Berwick, and the Conway and Britannia tubular iron Bridges. The latter great innovation in constructive art, which has since been extended to architectural construction with the greatest success, was at first viewed with great distrust; and it required some considerable time to convince the public of the security of such works: subsequently it was as difficult to settle the question as to the real originator of the system. We have here only to record that in 1855 the Council of Presidents and Vice-Presidents of the French Exposition, awarded to Mr. Robert Stephenson the Great

Gold Medal of Honour for the invention and introduction of the system of tubular plate-iron bridges, and First Class Silver Medals to Messrs. William Fairbairn and Eaton Hodgkinson, for their co-operation in the experiments; and also to Mr. Edwin Clark, for his aid in the consideration of the designs and in the construction of the bridge itself. As a further recognition, the Emperor added the decoration of the Legion of Honour. This system of construction has since been extended to the Victoria Bridge across the St. Lawrence River, in Canada, the total length of which is nearly two miles, in twenty-five spans. That bridge is the greatest example of the system, which has, however, also been employed on a large scale by Mr. Robert Stephenson, in the bridges across the Nile, at Benah and at Kaffre Azzayat, on the Egyptian Railway from Alexandria to Suez. The limits of this memoir will only permit the further mention of the remarkable constructions on the sea-shore between Conway and Bangor, for the protection of the Chester and Holyhead Railway; and the recent restoration of the iron bridge at Sunderland, which was the last engineering work upon which he was actively engaged.

Mr. Robert Stephenson was considered as the leader in the celebrated discussion, called the "battle of the gauges," for determining whether the narrow or the broad gauge should be the standard for the Kingdom. Events have since proved how correct were his views; and notwithstanding the brilliant talents of his friend, but then opponent, the late Mr. Brunel, the broad gauge did not spread beyond a certain district. It was, moreover, to his strenuous and persistent opposition that was due the rejection of the atmospheric system of traction, attempted to be introduced on the Dalkey, the Croydon, and the South Devon Railways.

For some years after he reduced the sphere of his active professional employment, he was engaged in several important public investigations, such as that of the Consulting Commission of the Metropolitan Sewers, and others. He made able investigations and reports upon various great undertakings, of which the Liverpool Water-works may be mentioned as an example; and he wrote the article "Iron Bridges" in the 'Encyclopædia Metropolitana.'

The work of his predilection was, however, the management of the Engine Factory at Newcastle-on-Tyne. To that he devoted him-

self as a labour of love, thinking over improvements and designing innovations, the necessity for which had become apparent in the working of his lines of railway.

In the year 1847, Mr. Robert Stephenson was elected to represent Whitby in Parliament, and he continued to sit for that borough until his decease. He did not speak much in the House; but when he spoke he always commanded attention, and on such questions as that of the Canal of the Isthmus of Suez, which he is well known to have strenuously opposed, he carried every one with him. He was a very useful member of Committees; and had his life been spared, there is no doubt that his services would have been even more frequently required by the Government, who had already learned to appreciate the honesty and truthfulness of his views.

He was devotedly attached to scientific investigations, and, as far as his occupations permitted, he was a frequent attendant at the various learned societies of which he was a member. He was elected a Fellow of the Royal Society in 1849, and served on the Council. He joined the Institution of Civil Engineers in the year 1830, was a member of Council, and filled the office of President from 1856 to 1858. He was also a Member of the Geological, Geographical, Astronomical, and Meteorological Societies, and of the Institute of Mechanical Engineers, as well as of numerous societies in the country. The honorary degree of D.C.L. was conferred upon him by the University of Oxford in 1857; and he had previously received a similar honour from the University of Durham.

A most successful professional career, unceasing activity and industry, combined with wisely considered investments, resulted in producing a very large fortune, which he employed during his lifetime most liberally, and from which at his decease, after providing munificently for his numerous relatives, and recollecting all his friends and dependents, he bequeathed upwards of £25,000 to a few charitable institutions and scientific societies,—and this after having given such sums as £3000 at a time to the Literary and Philosophical Society of Newcastle, to relieve it from debt, and to extend its sphere of utility, especially to young men of the working class—an advantage, by which Stephenson himself had profited in early life, and which he had never forgotten.

The health of Mr. Stephenson had not been good for the last two

years; and just before his last journey to Norway, he had complained of want of strength. Whilst in Norway he was very unwell, and exhibited such symptoms of decided liver complaint as induced his speedy return. During the voyage, heavy weather was experienced in the North Sea, and he was very sick and ill. On his arrival at Lowestoft, he was so weak as to be carried from his yacht to the railway, and from thence to his bed, at his residence in Gloucester Square, where his state grew so rapidly worse as to leave but faint hopes of his recovery. The affection of the liver was deeper than had been at first suspected, and was associated with further internal disease; and although his state was for a time alleviated, there was not sufficient strength to struggle against the malady, which terminated his valuable life on the 12th of October, 1859.

Thorough uprightness of character was in Mr. Stephenson joined with an amiable disposition, and he conciliated the affectionate regard of all with whom he came into immediate relation. To those who stood in need of his bounty his hand was ever open, but his beneficence was without display, and he rejoiced in an occasion of doing good unseen. His great care was for the children of old friends who had been kind to him in early life; and many young hearts, who owe their present position to his kind solicitude and generosity, will mourn his irreparable loss.

Mr. John Welsh, Superintendent of the Kew Observatory, was born at Boreland, in the Stewartry of Kirkcudbright, on the 27th of September, 1824. His father was George, the eighth son of John Welsh, Esq., of Craigenputtock, a small estate in that district, which had been in the family from an early period. Mr. George Welsh, who was extensively engaged in agriculture, died in 1835, and his widow with his two sons settled at Castle Douglas, where the elder—the subject of this notice—continued his preparatory education, and the younger died in 1841, in his 13th year.

In November 1839, Mr. John Welsh entered the University of Edinburgh, and studied Mathematics and Natural Philosophy, under Professors Kelland and Forbes, with a view to the profession of a Civil Engineer. He attained the highest prize but one of his year, also prizes in Classics; he also studied Geology in the lecture-room and in the field, under the late Professor Jameson.

In December 1842, Sir Thomas Brisbane, Bart., President of the Royal Society of Edinburgh, with the advice of Professor J. D. Forbes, engaged Mr. Welsh as an observer for his Magnetical and Meteorological Observatory at Makerstoun, under Mr. John Allan Broun, F.R.S., the Director, who, in his Report for 1845, says,—"I owe my best thanks to my principal assistant, Mr. John Welsh, for the care and assiduity with which he assisted me on all occasions, whether connected with the making or reducing of the observations..... The more difficult observations for the magnetic dip, and all the determinations of constants, were made by Mr. Welsh and myself."

In 1850, the period originally contemplated by Sir Thomas Brisbane for the duration of the Observatory being completed, Mr. Welsh was anxious to obtain some other scientific appointment. To aid him in the attainment of this object, Sir Thomas gave him a letter of introduction to Colonel Sykes, F.R.S., at that time Chairman of the Kew Committee of the British Association; Mr. Broun also wrote to Colonel Sykes, expressing his high opinion of Mr. Welsh's scientific ability; and accordingly, at the Edinburgh Meeting of the British Association in 1850, the Kew Committee reported that they had engaged Mr. Welsh to assist Mr. Ronalds, F.R.S., who had, ever since the establishment of the Observatory, gratuitously undertaken the office of Superintendent. From this period to within a short time of his death, Mr. Welsh devoted himself to scientific labour in that establishment, upholding and, year by year, increasing the efficiency of a physical Observatory, which, without any pecuniary aid from Government, has, since its commencement, been entirely supported by annual grants from the British Association, assisted from time to time by donations from the Royal Society.

In 1851, shortly after his appointment to the Kew Observatory, Mr. Welsh presented to the Association an elaborate Report on the performance of Mr. Ronalds's three Magnetographs; and at the same meeting (Ipswich) he described a Sliding Rule for Hygrometrical Calculations, and one for converting the observed readings of the Horizontal- and Vertical-force Magnetometers into variations of magnetic dip and total force; both sliding rules being devised by himself.

In the same year, the Committee, being impressed with the importance of enabling scientific observers at home and abroad to

obtain, at a moderate cost, barometers and thermometers of more accurate construction and trustworthy character than those usually sold, directed Mr. Welsh to undertake a series of experiments for that object. The results of his labours were most satisfactory, and are fully described in a paper printed in the Reports of the Association for 1853. Accordingly, at the present time, standard instruments are supplied to scientific investigators direct from the Observatory, and barometers and thermometers which have been compared with the standards at Kew, and each accompanied with its special table of corrections, are not only supplied to the Government Departments of the Admiralty and the Board of Trade, but can now be obtained from any instrument-maker at greatly reduced prices.

In the summer of 1852 Mr. Welsh made four ascents in a balloon, for scientific objects. A detailed account of these ascents and of the experiments he performed, with a description of the various instruments employed, and a statement of the general results obtained, was communicated to the Royal Society in 1853, and published in the 'Philosophical Transactions' for that year.

Sir John Herschel, in his article "Meteorology" in the 8th edition of the 'Encyclopædia Britannica,' makes the following remarks on Mr. Welsh's performance:—"All the observations were conducted with scrupulous precision, and the reductions very scientifically made; ... these four ascents leaving nothing to desire in point of instrumental appliances and scientific precision in their use."

In 1854, Mr. Welsh, at the request of the Kew Committee, undertook a series of experimental investigations on the action of the mercury in marine barometers, known under the term of "pumping." For this purpose, he went, in company with Mr. Adie, to Leith and back in a steamer, and subsequently to the Channel Islands. The result of his observations led him to the conclusion that the tube of a marine barometer should, in order to reduce the pumpings, be contracted, so that the mercury will take about twenty minutes to fall from the top of the tube to the height indicating the true pressure; and that by this means the probable error from the cause indicated would not exceed 0·01 of an inch. The account of these experiments was published in the Kew Report for 1853.

In 1855, in consequence of its having been represented to the Committee that Her Majesty's Government were anxious that mag-

netical and meteorological instruments, showing the advanced state of those sciences in this country, should be sent to the Paris Exhibition, Mr. Welsh was requested to proceed to Paris with the instruments and to superintend the arrangements. An account of the instruments appears in the Report of 1855 of the Kew Committee. In the 'Philosophical Transactions' for 1856 there is a paper of Mr. Welsh's entitled "An Account of the Construction of a Standard Barometer, and Description of the Apparatus and Processes employed in the Verification of Barometers at the Kew Observatory;" and in the 'Proceedings of the Royal Society,' vol. vi., a Report of the general process adopted in graduating and comparing the Standard Meteorological Instruments for the Kew Observatory; also a Report of the graduation of Thermometers supplied from the Observatory for the use of the Arctic Searching Expedition under Sir Edward Belcher.

In January 1856, a series of monthly determinations of the absolute magnetical force, and of the magnetic dip, was commenced at the Observatory by Mr. Welsh, with instruments provided by General Sabine from his department at Woolwich; and in the same year a set of self-recording magnetometers were constructed: these were arranged in the basement of the Observatory, and have been in action since January 1858. In the Report of the British Association for 1856, Mr. Welsh described a process for the graduation of boiling-point thermometers intended for the measurement of heights.

In 1857 Mr. Welsh was elected a Fellow of the Royal Society—a position, to which his qualifications fully entitled him to aspire, but which his natural diffidence would have led him to postpone, had it not been urged on him by those who appreciated his merits. To his personal friends he always spoke with feelings of gratitude of the mode in which his services to science had been thus recognized.

Twenty years having elapsed since the execution of the Magnetic Survey of the British Islands, it was determined by the British Association that another survey should be made. With this view, a Committee, consisting of the same five members by whom the former survey was conducted, with the addition of Mr. Welsh, was appointed, and Mr. Welsh undertook the Magnetic Survey of the North British division of the United Kingdom. In the summer of 1857 he determined the magnetic elements at thirty-one stations, and in the summer

of last year he resumed his labours, completing the survey at twenty-four other stations in Scotland and the adjacent islands.

Through the winter of 1857–58, Mr. Welsh had suffered from an affection of the lungs; and on his return from Scotland, in the autumn of 1858, the disease had evidently made rapid progress. Arrangements had been made which would have enabled him to pass the winter in a tropical climate; but acting under the best medical advice that could be procured in the metropolis, he, accompanied by his mother, proceeded to Falmouth. In that place, by the kindness of Mr. R. W. Fox and his family, Mr. Welsh received every attention which they had it in their power to offer. His only regret during his illness appears to have been his inability to complete the works he had undertaken. He died on the 11th of May, 1859, in the 35th year of his age, not less esteemed for his private worth by those who had the pleasure of his acquaintance, than appreciated for his eminent abilities and valuable services by men of science.

Peter Gustav Lejeune Dirichlet was born at Düren, where his father was Commissaire de Poste, on the 13th of February, 1805. After going through the course of instruction followed in the Gymnasium of Cologne, he went to Paris to continue his studies, and in May 1823 he became tutor in the family of General Foy. Here he formed an acquaintance with the most distinguished mathematicians of France. On the recommendation of Fourier, who was the first to appreciate his genius, and aided by Gauss, Von Humboldt procured for him an appointment in Prussia. In November 1827 he obtained the position of Teacher in the University of Breslau, and in the year following was nominated Professor Extraordinary. Being appointed soon after to lecture at the Royal Military School of Berlin, he became Professor Extraordinary in the University of that place. On the 13th of February, 1832, he was elected a Member of the Royal Academy of Sciences of Berlin; on the 6th of May, 1833, Corresponding Member of the Institute of France; in 1833 Corresponding Member of the St. Petersburg Academy; in 1839 Ordinary Professor of the University of Berlin; in 1846 Member of the Göttingen Academy of Sciences. In 1847 a Professorship in the University of Heidelberg was offered to him. In 1854 he was elected Member of the Academies of Stockholm and Munich, and Foreign

Associate of the French Academy; and in 1855 Member of the Belgian Academy, and Foreign Member of the Royal Society.

After the death of Gauss he was appointed Professor of the Higher Mathematics in the University of Göttingen, in the spring of 1855, and entered upon the duties of his office in the autumn of the same year. He returned in bad health from an excursion in Switzerland in the autumn of 1858, and died at Göttingen on the 5th of May, 1859.

By his death the University of Göttingen has lost not only a distinguished teacher and a man of the brightest intellect, but perhaps the only mathematician of the time likely to succeed in completing the unfinished works of Gauss, a task which he had declared himself willing to undertake.

His mathematical memoirs, the first of which was presented to the Institute of France in 1825, are too numerous to admit of introducing their titles into this notice. They are published in the 'Transactions' of the Berlin Academy from the year 1833 to 1854, in 'Crelle's Journal' from 1828 to 1857, in the 'Monatsberichte' of the Academy for 1852–1855, and in volumes iv., v., ix., xii. of 'Liouville's Journal.'

The Baron Friedrich Heinrich Alexander von Humboldt, was the second son of Alexander George von Humboldt, descended from a noble Pomeranian family. His father was a major in the Prussian army, and had served with distinction as aide-de-camp to the Duke Ferdinand of Brunswick in the seven years' war. The distinguished subject of our present brief notice was born at Berlin on the 14th of September, 1769. At the age of ten years he lost his father. From 1787 to 1789 he studied, first for some months in the University of Frankfort on the Oder, and afterwards in that of Göttingen. During the vacations, he made geological excursions to the Harz, and on the banks of the Rhine, and published the results of his observations under the title 'Ueber die Basalte am Rhein, nebst Untersuchungen über Syenit und Basanit der Alten.' In the spring of 1790 he made a hasty excursion through Holland, England, and France, in the company of George Forster, who sailed with Cook in his second voyage round the world. On his return from this excursion, he passed some months at Hamburg, preparing himself for a post in the Finance department of his native country. In June 1791

he went to Freiberg, where he attended the lectures of Werner, and became acquainted with Von Buch and Del Rio. During his residence at Freiberg he collected the materials for his work entitled 'Specimen Floræ subterraneæ Fribergensis et aphorisimi ex physiologia chemica plantarum.' After obtaining an appointment in the Administration of Mines at Berlin, he filled the office of Director-General of the mines of Ansbach and Baireuth from 1792 to 1797. During this time he prepared his work on the irritability of muscular and nervous fibre. On the death of his mother in 1796, his desire to travel increased. He resigned the post of Director of Mines, and devoted himself to the study of practical astronomy under v. Zach. After passing some months at Jena and Vienna, he made an attempt to visit Italy, accompanied by v. Buch, for the purpose of examining the volcanos of that country. Being forced by the war of which Italy was the scene to relinquish this undertaking, he passed the winter of 1797–1798 in the study of meteorology at Salzburg and at Berchtesgaden. He was invited by Lord Bristol to accompany an exploring party into Upper Egypt, and went to Paris to procure the necessary instruments. On his arrival, in May 1798, he was apprised of the failure of Lord Bristol's project in consequence of the departure of the French expedition for Egypt. Here he became acquainted with his future fellow-traveller Bonpland. He obtained permission from the Directory to accompany Baudin in his voyage round the world. The sailing of this expedition having been postponed, he made an attempt to join the French in Egypt. Failing, however, in consequence of the non-arrival of a Swedish frigate in which he had been promised a passage to Tunis, he went to Spain, accompanied by Bonpland, where he passed the winter of 1798–1799. Encouraged by the Spanish Minister, Luis de Urquijo, to visit Spanish America, he and Bonpland embarked at Corunna on the 5th of June, 1799. They landed at Santa Cruz on the 19th of June, ascended the Peak and explored the Island of Teneriffe. On the 16th of July they reached the Cumana. After having traversed Venezuela, the valleys of the Orinoco and Amazon, the countries of Peru and Mexico, Humboldt embarked on the 7th of March, 1804, for the Havana, where he remained six months. After visiting the United States, he sailed from America on the 9th of June, and landed at Bordeaux on the 3rd of August, 1804.

He made Paris his residence from 1805 till 1827, occupying himself with the publication of the results of his travels, in eight separate works, and with various chemical and physical researches. He visited Naples with Gay-Lussac and v. Buch in 1805. During the residence of Prince William of Prussia in Paris in 1807–1808, Humboldt held a diplomatic appointment. In 1814 he accompanied his elder brother Wilhelm v. Humboldt, then sent on an embassy to London, and was elected a Foreign Member of the Royal Society in 1815. His 'Mémoire sur les lignes isothermes' appeared in 1817. He was present at the Congress of Aix-la-Chapelle in 1818, and at that of Verona in 1822, and in the same year accompanied the late King of Prussia to Naples.

From the year 1827 he made Berlin his home. In 1829 he travelled with Ehrenberg and G. Rose, under the auspices of the Emperor Nicholas, through Siberia, as far as the frontiers of China. The results of this journey, which lasted nine months, are published in his 'Asie Centrale,' and in G. Rose's 'Reise nach dem Ural, Altai, und dem Caspischen Meere.'

After the French Revolution of 1830, v. Humboldt was commissioned by Frederick William III. to recognize the accession of Louis Philippe on the part of Prussia. About this time he completed his 'Examen critique de la Géographie du nouveau Continent.' In 1841 he accompanied King Frederick William IV. to England, and visited Paris for the last time in the winter of 1847–1848. In 1845 he published the first volume of 'Cosmos,' a work which may be regarded as a development upon an extended scale of his 'Ansichten der Natur,' the third edition of which appeared in 1849. The first part of the fourth volume of 'Cosmos' appeared early in 1858; the second part is so far prepared that no obstacles to its completion are anticipated.

He enjoyed good health till near the end of his life. In October 1858, he was attacked by an illness from which he never completely recovered. On the 21st of April, 1859, in consequence of a cold, he was unable to leave his bed. He retained the use of his faculties till the morning of the 6th of May, when he became speechless, and died at half-past two in the afternoon of the same day.

In 1852 the Royal Society awarded him the Copley Medal for his eminent services in Terrestrial Physics, and he considered this to be

the highest honour he had ever received. A letter from Dr. Pertz, the Librarian of the Royal Library at Berlin, to Sir Charles Lyell, states, that the Medal was found after his death amongst the objects which he wished to be for ever preserved in the family archives at Tegel. The outer envelope of the box containing the medal bore this inscription in his own handwriting: "Die wichtige berühmte Copleysche Preis-Medaille der königlichen Societät (in meiner Familie aufzubewahren in Tegel). Al. Humboldt. Sept. 1858." On the exterior envelope he had written: "Das ehrenvollste, das ich besitze, die berühmte Copleysche Ehren-Medaille der königlichen Societät zu London von 1852 in familien Archiv zu Tegel aufzubewahren. Al. Humboldt. 6 März, 1859."

Looking forward to the probable appearance of a complete biography of this illustrious philosopher and traveller at no very distant period, it is needless at the present time to enter more fully into the details of his life and labours.

Karl Ritter was born at Quedlinburg on the 7th of August, 1779. His education was completed in the University of Halle. In 1798 he became tutor in the family of M. Bethmann Hollweg, and travelled with his pupils through a large portion of Europe. He then went to Göttingen, in order to avail himself of the library of that place in prosecuting his researches in ancient history. After four years' assiduous labour, he succeeded Schlösser as Professor of History at Frankfort; he was then chosen Professor of Geography in the Military School, and afterwards Professor of History in the University of Berlin.

He was a Knight of the Order Pour le Mérite; Member of the Academy of Sciences of Berlin; Foreign Associate of the French Institute; Foreign Member of the Academies of Sciences of Göttingen, Copenhagen, St. Petersburg, and Munich; Honorary Member of the Vienna Academy of Sciences, and of numerous other literary and scientific societies. He was elected a Foreign Member of the Royal Society in 1848. He died on the 28th of September, 1859.

The most important of Ritter's works is the second edition of the 'Allgemeine vergleichende Geographie,' the first volume of which appeared in 1822, and the twenty-third in 1859, accompanied by an Atlas, on which Etzel, Grimm, Mahlmann and Kiepert have

laboured in succession. This work, though still incomplete (of the three parts the author intended to devote to Asia Minor, only two, parts xviii. and xix. have been published), is considered the most valuable work on Geography in existence. Among the other writings of Ritter, the following deserve especially to be mentioned :—'Europa ein geographisch-statistisches Gemälde' (1807); Vorhalle Europaischer Völkergebilde vor Herodot' (1820); 'die Stupas' (1838); 'die Colonisirung von New-Seeland' (1842); 'Blick auf das Nilquell-land' (1844); 'der Jordan, und die Beschiffung des Todten Meeres' (1850); 'Blick auf Palestina' (1852); 'das Kameel' (1852). Many memoirs by Ritter have appeared in the 'Transactions' of the Berlin Academy, and in the 'Journal of Universal Geography.' Some of these have been collected and published under the title of 'Einleitung zu einer mehr wissenschaftlichen Behandlung der Erdkunde.'

These labours entitle M. Ritter to be considered as the creator of scientific geography. Instead of limiting geography to collecting isolated facts, and descriptions without logical order, he tried to discover the natural and intimate relations which exist between a country and its inhabitants: employing all the ideas which history and the natural sciences supply, he has drawn conclusions, which have erected the geography of the present time into a kind of physiology of the earth.